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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,913	02/10/2004	Joseph J. Bergmeister	60605-00010USPT	1222

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CHEVRON PHILLIPS CHEMICAL COMPANY
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EXAMINER

BOYER, RANDY

ART UNIT	PAPER NUMBER
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1764

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/28/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/775,913	Applicant(s) BERGMEISTER ET AL.	
	Examiner Randy Boyer	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10 February 2004 and 23 August 2004.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6, 9-16, 19-24, and 27-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Thanh (US 6054409).

3. With respect to claim 1, Thanh discloses a catalyst for the selective hydrogenation of acetylene (column 1, lines 14-17), comprising (a) an alumina support (column 3, line 19), wherein the support has a round external surface (column 3, line 21), a surface area of $10 \text{ m}^2/\text{g}$ (column 5, line 8), and a pore volume of $0.6 \text{ cm}^3/\text{g}$ (column 5, line 9); (b) palladium in the amount 0.025 % by weight of catalyst (column 5, line 11), wherein substantially all of the palladium is concentrated in a skin periphery of the catalyst (column 4, lines 61-64), and wherein the skin has a thickness of 400 microns (column 4, lines 62-64); and (c) silver in an amount 2 times the weight of the palladium (column 5, line 12), wherein the silver is distributed throughout the catalyst (column 4, lines 61-64).

4. With respect to claims 2-4, Thanh discloses a support in the form of spherules or extrudates (column 3, line 21).

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5. With respect to claim 5, Thanh discloses a support with a pore diameter greater than 100 Angstroms (column 3, line 26).
6. With respect to claim 6, Thanh discloses a catalyst further comprising an alkali metal present at 2% by weight of the catalyst (column 3, line 62).
7. With respect to claim 9, Thanh discloses catalyst particles in the range 2 mm to 4 mm (column 3, line 22).
8. With respect to claims 10 and 11, Thanh discloses a catalyst with a weight ratio of silver to palladium of 2 (column 4, line 59).
9. With respect to claim 12, Thanh discloses a catalyst containing 0.025 weight percent palladium (column 4, line 58).
10. With respect to claim 13, Thanh discloses preparing a catalyst by impregnating alumina particles with a solution of palladium nitrate (column 4, lines 50-53).
11. With respect to claim 14, Thanh discloses preparing a catalyst by mixing the catalyst particles with a solution of silver nitrate (column 4, lines 50-53).
12. With respect to claim 15, Thanh discloses a selectivity of the catalyst for the conversion of acetylene to ethylene greater than 40% (column 7, Table 1).
13. With respect to claim 16, Thanh discloses a catalyst wherein the palladium is 0.025% by weight of the catalyst (see column 5, line 10).
14. With respect to claim 19, Thanh discloses a method for the treatment of a gaseous mixture comprising acetylene, which method comprises selectively hydrogenating the acetylene therein by contacting the mixture together with hydrogen with a catalyst with a catalyst; wherein the catalyst comprises an alumina support,

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wherein the support has a round external surface, a surface area of $10 \text{ m}^2/\text{g}$ (column 5, line 8), and a pore volume of $0.6 \text{ cm}^3/\text{g}$ (column 5, line 9); wherein the catalyst comprises palladium in the amount 0.025 % by weight of catalyst (column 5, line 11), wherein substantially all of the palladium is concentrated in a skin periphery of the catalyst (column 4, lines 61-64), and wherein the skin has a thickness of 400 microns (column 4, lines 62-64); and wherein the catalyst comprises silver in an amount 2 times the weight of the palladium (column 5, line 12), wherein the silver is distributed throughout the catalyst (column 4, lines 61-64).

15. With respect to claims 20-22, Thanh discloses a support in the form of spherules or extrudates (column 3, line 21).

16. With respect to claim 23, Thanh discloses a support with a pore diameter greater than 100 Angstroms (column 3, line 26).

17. With respect to claim 24, Thanh discloses a catalyst further comprising an alkali metal present at 2% by weight of the catalyst (column 3, line 62).

18. With respect to claim 27, Thanh discloses wherein the gaseous mixture contains less than about 1000 ppm of carbon monoxide (column 6, lines 48-49).

19. With respect to claims 28 and 30, Thanh discloses wherein the weight ratio of silver to palladium in the catalyst is 2 (column 5, lines 10-12).

20. With respect to claim 29, Thanh discloses wherein the dimensions of the catalyst particles are in the range 2mm to 4mm (column 3, line 22).

21. With respect to claim 31, Thanh discloses a hydrogenation temperature of 50°C and space velocity of 3300 h^{-1} (column 6, lines 53 and 58).

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22. With respect to claim 32, Thanh discloses wherein the gas mixture contains no more than about 800 ppm of carbon monoxide (column 6, lines 48-49).

23. With respect to claim 33, Thanh discloses wherein the catalyst is prepared by impregnating alumina particles with a palladium solution (column 4, line 53), calcining the impregnated alumina particles (column 4, line 57), and mixing the particles with an aqueous solution of silver nitrate (column 4, line 53).

24. With respect to claim 34, Thanh discloses wherein the catalyst contains 0.025% by weight of palladium (column 4, line 58).

25. With respect to claim 35, Thanh discloses wherein the catalyst is housed in a vessel (column 6, lines 50-51), further comprising: (a) flowing the acetylene through the vessel to contact the catalyst (column 6, lines 56-58); (b) flowing a heat transfer fluid across an exterior surface of the vessel to remove heat from the vessel (column 6, line 54); and (c) modulating the flow of heat transfer fluid to maintain a temperature of the heat transfer fluid within a predetermined range (column 6, lines 51-52).

26. With respect to claim 36, Thanh discloses a hydrogenation temperature of 50°C (column 6, line 54).

27. With respect to claims 37 and 39, Thanh discloses wherein a selectivity of the catalyst for the conversion of acetylene to ethylene is greater than 50% (column 7, Table 1).

28. With respect to claims 38 and 40, Thanh discloses wherein the palladium is 0.025% by weight of the catalyst (column 4, line 58).

Claim Rejections - 35 USC § 103

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

30. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

31. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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32. Claims 1, 6-8, 17, 18, 25, 26, and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung (US 5475173) in view of Thanh (US 6054409) or, alternatively, in view of Thanh (US 6054409) and Likins (US 2946829).

33. With respect to claim 1, Cheung discloses a catalyst for the selective hydrogenation of acetylene, comprising: (a) an alumina support (see Cheung, column 5, line 36), wherein the support has a round external surface (see Cheung, column 5, lines 27-28), and a surface area in the range 1-200 m²/g (see Cheung, column 2, line 64); (b) 0.28% palladium by weight of the catalyst (see Cheung, column 6, line 21); and (c) 2.6% silver by weight of the catalyst (see Cheung, column 6, line 22).

Cheung does not disclose a support having a pore volume of about 0.24 to about 0.64 cm³/g or concentrating the palladium in the skin periphery of the catalyst wherein the skin thickness is less than about 400 microns.

However, Thanh discloses a catalyst for the selective hydrogenation of acetylene (see Thanh, column 1, lines 14-17), comprising (a) an alumina support (see Thanh, column 3, line 19), wherein the support has a round external surface (see Thanh, column 3, line 21), a surface area of 10 m²/g (see Thanh, column 5, line 8), and a pore volume of 0.6 cm³/g (see Thanh, column 5, line 9); (b) palladium in the amount 0.025 % by weight of catalyst (see Thanh, column 5, line 11), wherein substantially all of the palladium is concentrated in a skin periphery of the catalyst (see Thanh, column 4, lines 61-64), and wherein the skin has a thickness of 400 microns (see Thanh, column 4, lines 62-64); and (c) silver in an amount 2 times the weight of the palladium (see Thanh, column 5, line 12), wherein the silver is distributed throughout the catalyst (see Thanh,

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column 4, lines 61-64). Furthermore, it is known in the art that using a catalyst support having small pore volume and concentrating a palladium catalyst solution upon the surface of such carrier will provide for high catalyst activity at lower reaction temperatures and prolonged catalyst activity over extended periods of use (see e.g., Likins (US 2946829) at columns 2 and 3).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the invention of Cheung so as to incorporate the use of a catalyst support having a small pore volume and impregnating such support so as to concentrate the palladium catalyst in the skin periphery.

34. With respect to claim 6, Thanh discloses a catalyst further comprising an alkali metal present at 2% by weight of the catalyst (see Thanh, column 3, line 62).

35. With respect to claims 7, 8, 25, and 26 Cheung discloses a catalyst further comprising fluoride in the range of about 0.1 to 10 times the molar concentration of potassium present in the catalyst (see Cheung, column 2, lines 65-67, and column 3, lines 1-7).

36. With respect to claim 17, Cheung discloses a catalyst having a selectivity for the conversion of acetylene to ethylene greater than 50% (see Cheung, Table I).

37. With respect to claim 18, Cheung discloses a catalyst wherein the palladium is 0.28 weight percent of the catalyst (see Cheung, column 6, line 21).

38. With respect to claim 41, the prior art discloses a catalyst for the selective hydrogenation of acetylene, comprising: (a) an alpha alumina support (see Thanh, column 3, line 19), wherein the support has a round external surface (see Thanh,

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column 3, line 21), a surface area of $10 \text{ m}^2/\text{g}$ (see Thanh, column 5, line 8), a pore diameter of greater than 100 Angstroms (see Thanh, column 3, line 26), and a pore volume of $0.6 \text{ cm}^3/\text{g}$ (see Thanh, column 5, line 9); (b) palladium in the amount 0.025 % by weight of catalyst (see Thanh, column 5, line 11), wherein substantially all of the palladium is concentrated in a skin periphery of the catalyst (see Thanh, column 4, lines 61-64), and wherein the skin has a thickness of 400 microns (see Thanh, column 4, lines 62-64); (c) silver in an amount 2 times the weight of the palladium (see Thanh, column 5, line 12), wherein the silver is distributed throughout the catalyst (see Thanh, column 4, lines 61-64); (d) potassium at 1.3 weight % of the catalyst (see Cheung, column 6, line 22); and (e) fluoride in the range 0.1 to 10 times the molar concentration of the potassium present in the catalyst (see Cheung, column 3, lines 5-6).

39. With respect to claim 42, Cheung discloses a catalyst having a selectivity for the conversion of acetylene to ethylene greater than 50% (see Cheung, Table I).

40. With respect to claim 43, Thanh discloses a catalyst containing palladium 0.025% palladium by weight of the catalyst (see Thanh, column 4, line 58).

Conclusion

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB

A handwritten signature in black ink, appearing to be 'Alvin' or similar, written in a cursive style.